



[www.EnergyJustice.net](http://www.EnergyJustice.net)

*...helping communities protect  
themselves from polluting energy  
and waste technologies*



[www.zerowastecanada.ca](http://www.zerowastecanada.ca)

# Biomass / Waste Incineration



[www.EnergyJustice.net/incineration/](http://www.EnergyJustice.net/incineration/)

# Energy Justice Network

Map BETA

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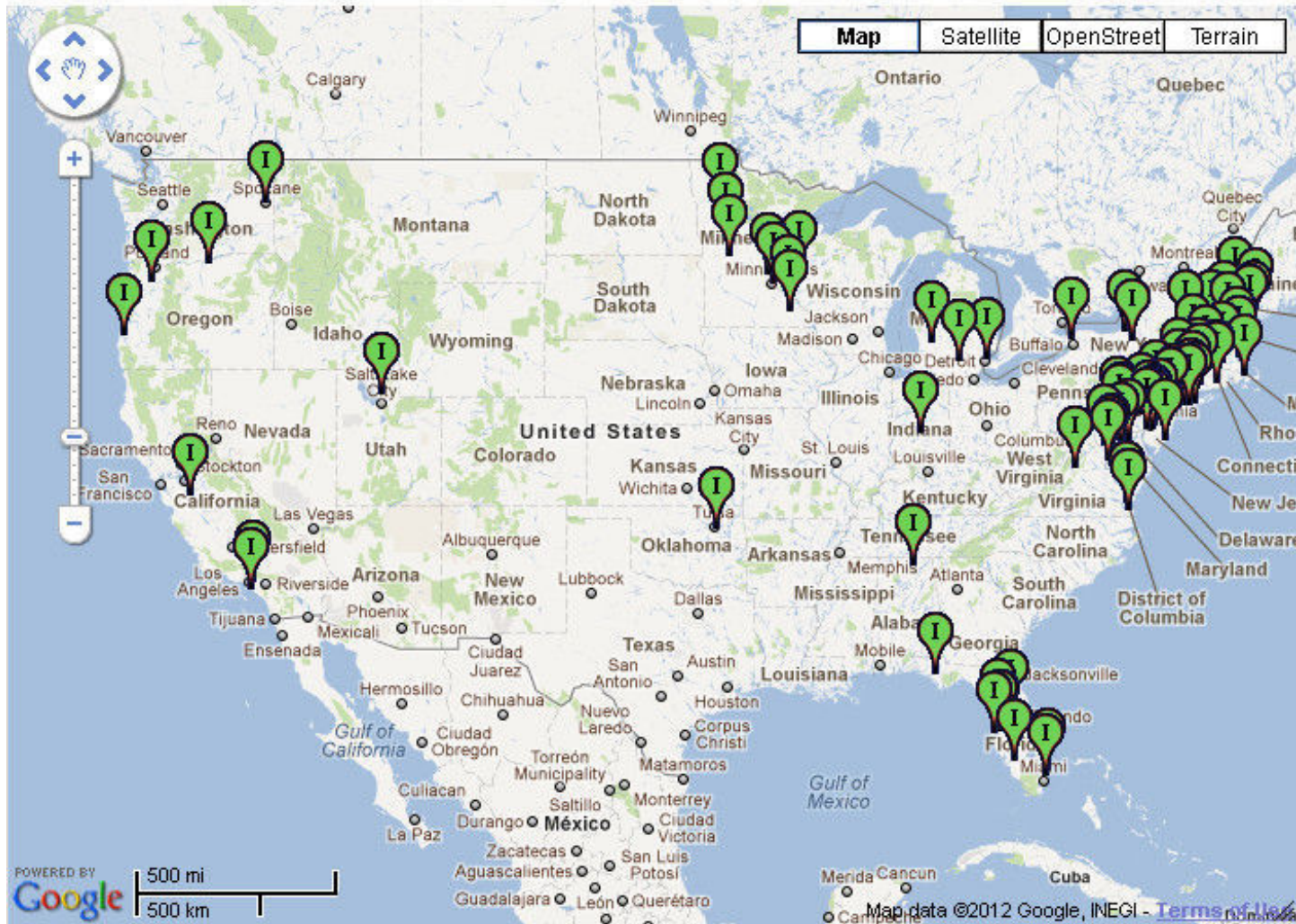
Facilities

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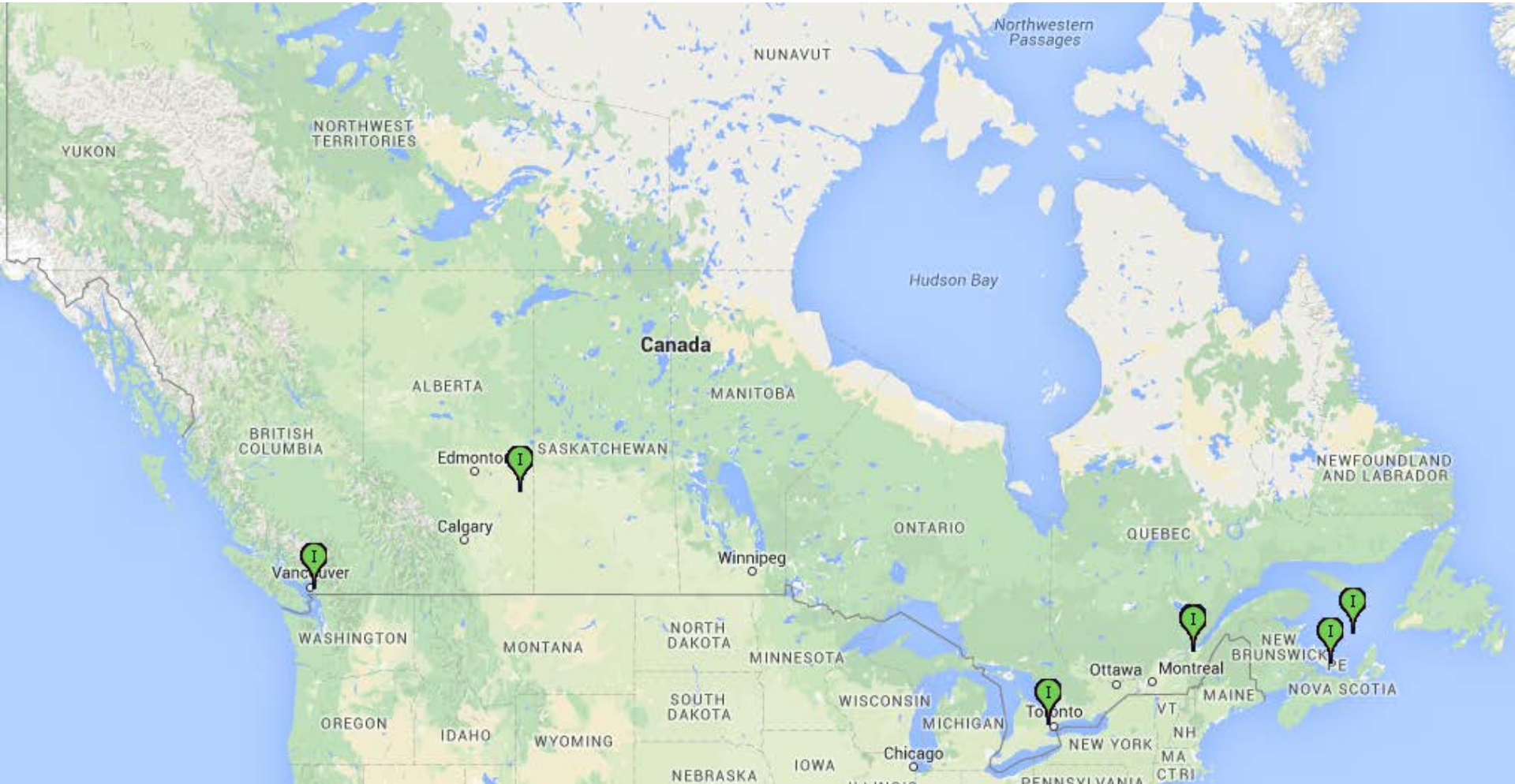
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## National Map



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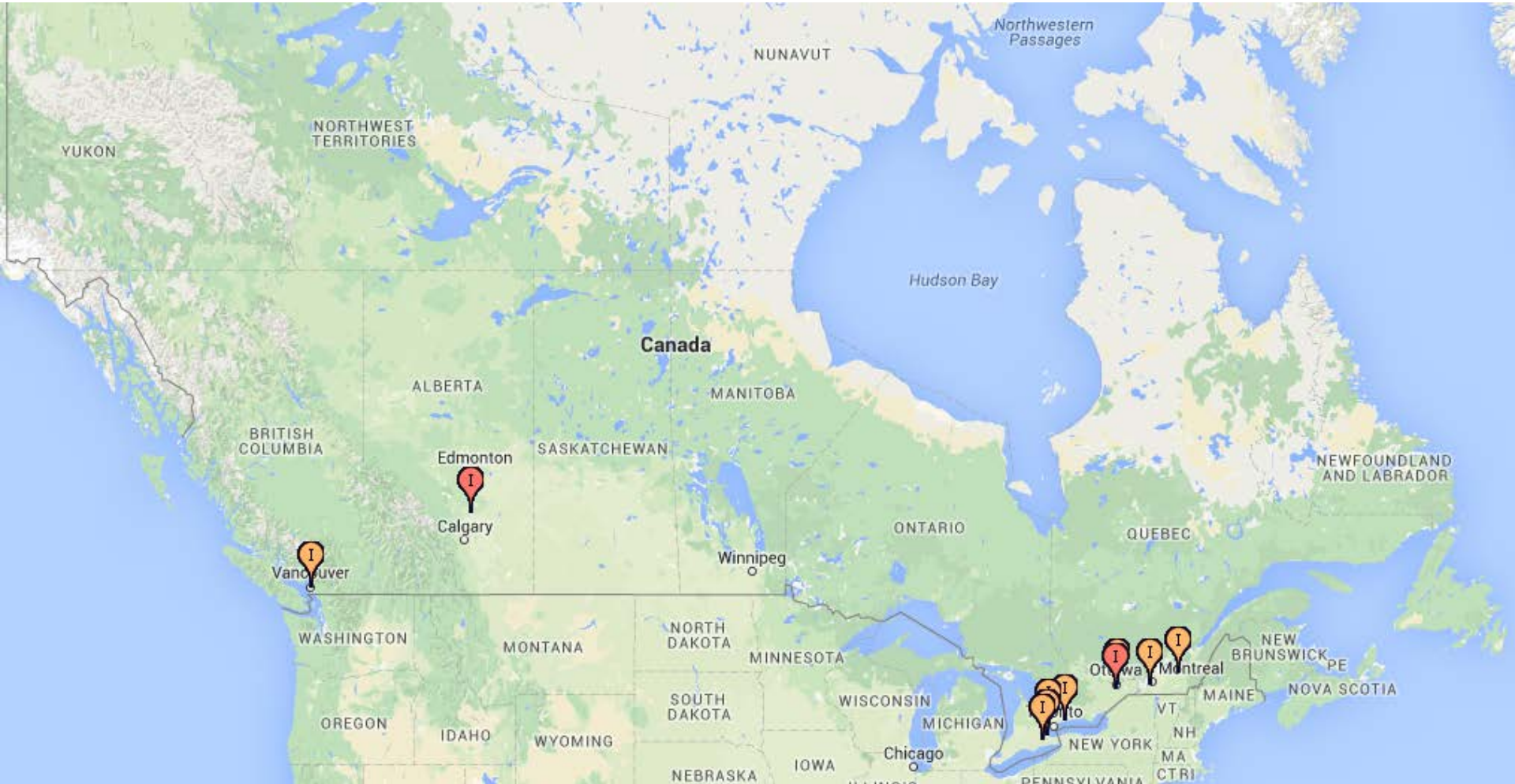
# Operating Trash Incinerators in Canada



[www.EnergyJustice.net/map](http://www.EnergyJustice.net/map)

# Proposed Trash Incinerators in Canada

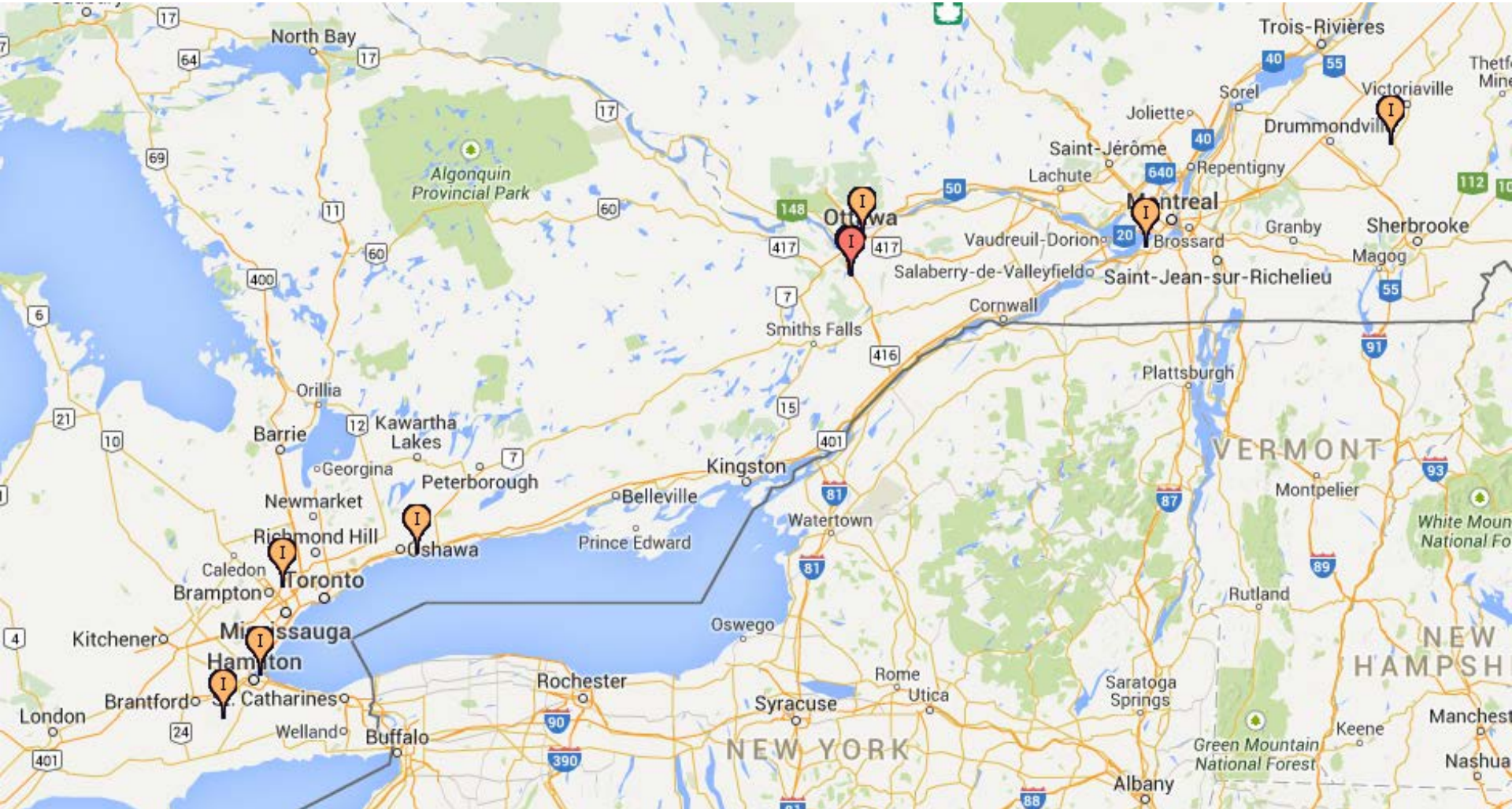
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[www.EnergyJustice.net/map](http://www.EnergyJustice.net/map)

# Proposed Trash Incinerators in Ontario

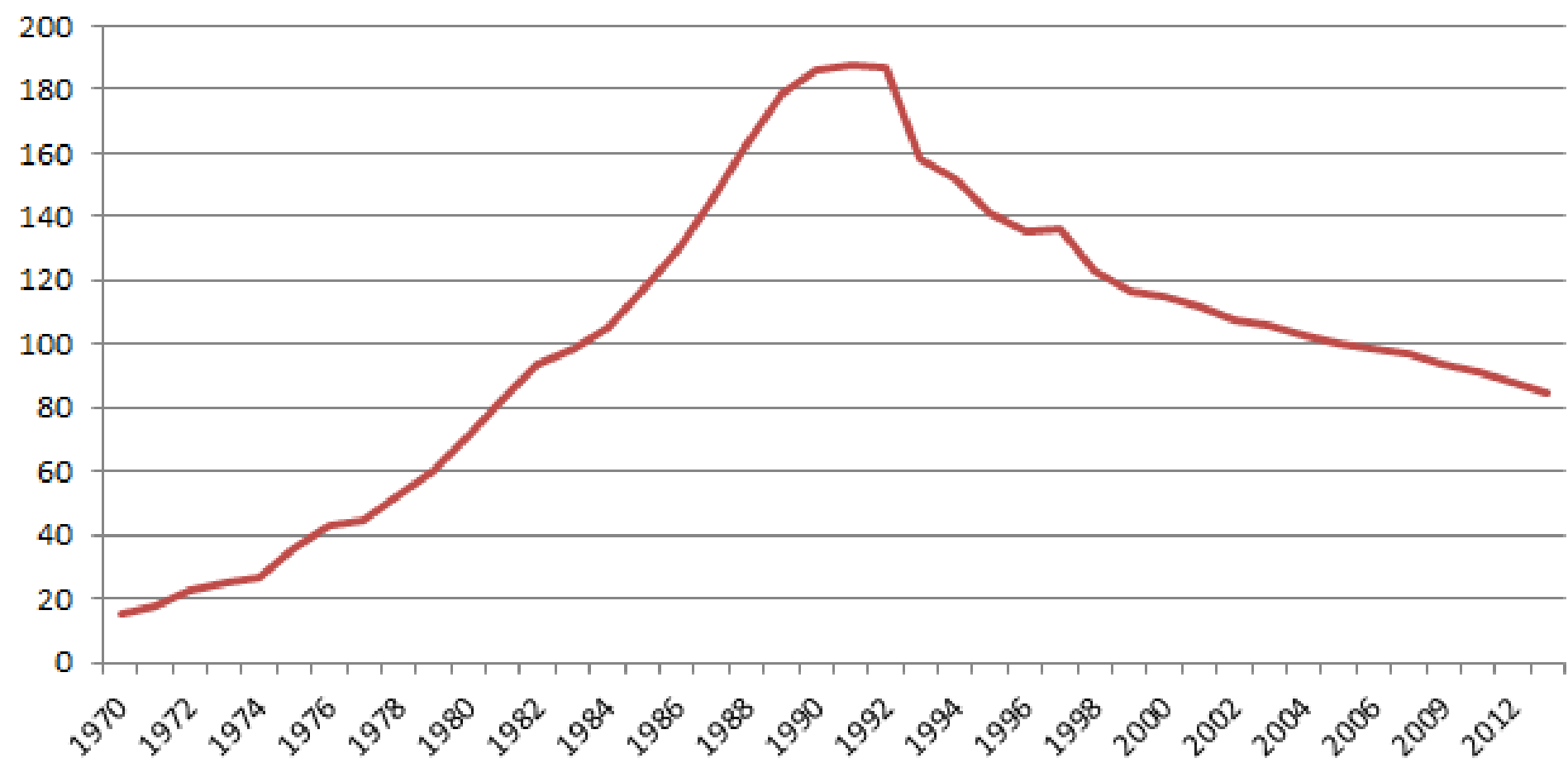
(red = dead)



[www.EnergyJustice.net/map](http://www.EnergyJustice.net/map)



# Number of Commercial Trash Incinerators Operating in the U.S.





# World's largest waste corporation driving away from incineration



## THE WALL STREET JOURNAL

Jan 3, 2014: “Big Waste Hauler Rethinks Startups”

*[pulls out of gasification, pyrolysis, plasma and trash-to-ethanol investments, selling off Agilyx, Enerkem, Fulcrum, Genomatica & InEnTec]*

Jul 29, 2014: “Waste Management to Sell Wheelabrator for \$1.94 Billion”

*[pulls out of long-standing ownership of Wheelabrator, the second-largest operator of conventional incinerators in U.S.]*

# Incinerators: Names Used

- Waste-to-energy (WTE)
- Energy from Waste (EfW)
- Trash-to-steam
- Gasification
- Pyrolysis
- Plasma Arc
- Conversion technologies
- Biomass
- Advanced Thermal Tech
- Waste to Fuel (WTF?)



**BURN** *Baby* **BURN**

# Biomass Incineration: Wastes/Fuels

## Includes...

- Municipal Solid Waste (Trash)
- Tires
- Sewage Sludge
- Construction / Demolition (C&D) Wood Waste
- Animal Factory Wastes
- Paper & Lumber Mill Wood Wastes
- Agricultural Crop Residue
- Energy Crops
- Forest Cutting
- "Urban" Wood Waste (tree trimmings)
- Landfill Gas
- Digester Gas



# EPA says pyrolysis = incineration

## 40 CFR 60.51a:

- **Municipal waste combustor**, MWC, or municipal waste combustor unit: (1) **Means any setting or equipment that combusts solid, liquid, or gasified MSW including, but not limited to**, field-erected incinerators (with or without heat recovery), modular incinerators (starved-air or excess-air), boilers (i.e., steam-generating units), furnaces (whether suspension-fired, grate-fired, mass-fired, air curtain incinerators, or fluidized bed-fired), and **pyrolysis/combustion units**.
- **Pyrolysis/combustion unit** means **a unit that produces gases, liquids, or solids through the heating of MSW, and the gases, liquids, or solids produced are combusted and emissions vented to the atmosphere.**

“**A municipal waste incinerator** 'combusts' solid waste and thus **is functionally synonymous with municipal waste combustor.**”

([www.epa.gov/ttn/nsr/gen/rm\\_2.html](http://www.epa.gov/ttn/nsr/gen/rm_2.html))

# Experimental Types of Incinerators Don't Work

**Gasification, plasma arc and pyrolysis:**

- **Can't run continuously**
- **Can't be run effectively at commercial scale**
- **Can't process heterogenous feedstocks like trash**
- **Companies with no real history bamboozle local officials into subsidizing projects that fail, technically and financially**
- **The companies usually lie about their emissions, claiming zero emissions or “no smokestack”**

# Technologies and Risk

Source: Gershman, Brickner & Bratton, Inc. August 2012

Alternative	Risks/Liability	Risk Summary
Mass Burn/WaterWall	Proven commercial technology	Very Low
Mass Burn/Modular	Proven commercial technology	Low
RDF/ Dedicated Boiler	Proven commercial technology	Low
RDF/Fluid Bed	Proven technology; limited U.S. commercial experience	Moderate to Low
Anaerobic Digestion	Proven technology; limited U.S. commercial experience	Moderate to Low
Mixed-Waste Composting	Previous large failures; No large-scale commercially viable plants in operation; subject to scale-up issues	Moderate to high
Pyrolysis	Previous failures at scale, uncertain commercial potential; no operating experience with large-scale operations	High
Gasification	Limited operating experience at only small scale; subject to scale-up issues	High
Chemical Decomposition/ Depolymerization	Technology under development; not a commercial option at this time	High



# Basic Lessons

- Garbage-in, Garbage-out.
- Nothing is 100%.
- Small amounts matter, especially if they're a small % of a BIG number.
- If incineration is the answer, someone asked the wrong question
- Incinerators are habitual law-breakers and Covanta is notorious



# Bigger Problems with Incinerators

- Destroys materials / net energy issues
  - “waste-OF-energy” – **3-5 times** more energy saved by recycling/composting
- Environmental racism
- Global warming contribution worse than zero waste solutions
- Makes the problem "invisible" rather than making it very visible so that unsustainably-produced products can be properly dealt with



Incinerators are...

~~Trash-to-Steam~~

*Trash to toxic ash and toxic  
air emissions*

Incinerators are...

~~Waste-to-Energy~~

*Waste-OF-energy*

*(3-5 times more energy wasted by not recycling/composting the materials burned)*

Source: Morris, Jeffrey, and Canzoneri, Diana, "Recycling Versus Incineration: An Energy Conservation Analysis," Sound Resource Management Group (SRMG) Seattle, Washington, September, 1992.

[www.sciencedirect.com/science/article/pii/0304389495001166](http://www.sciencedirect.com/science/article/pii/0304389495001166)



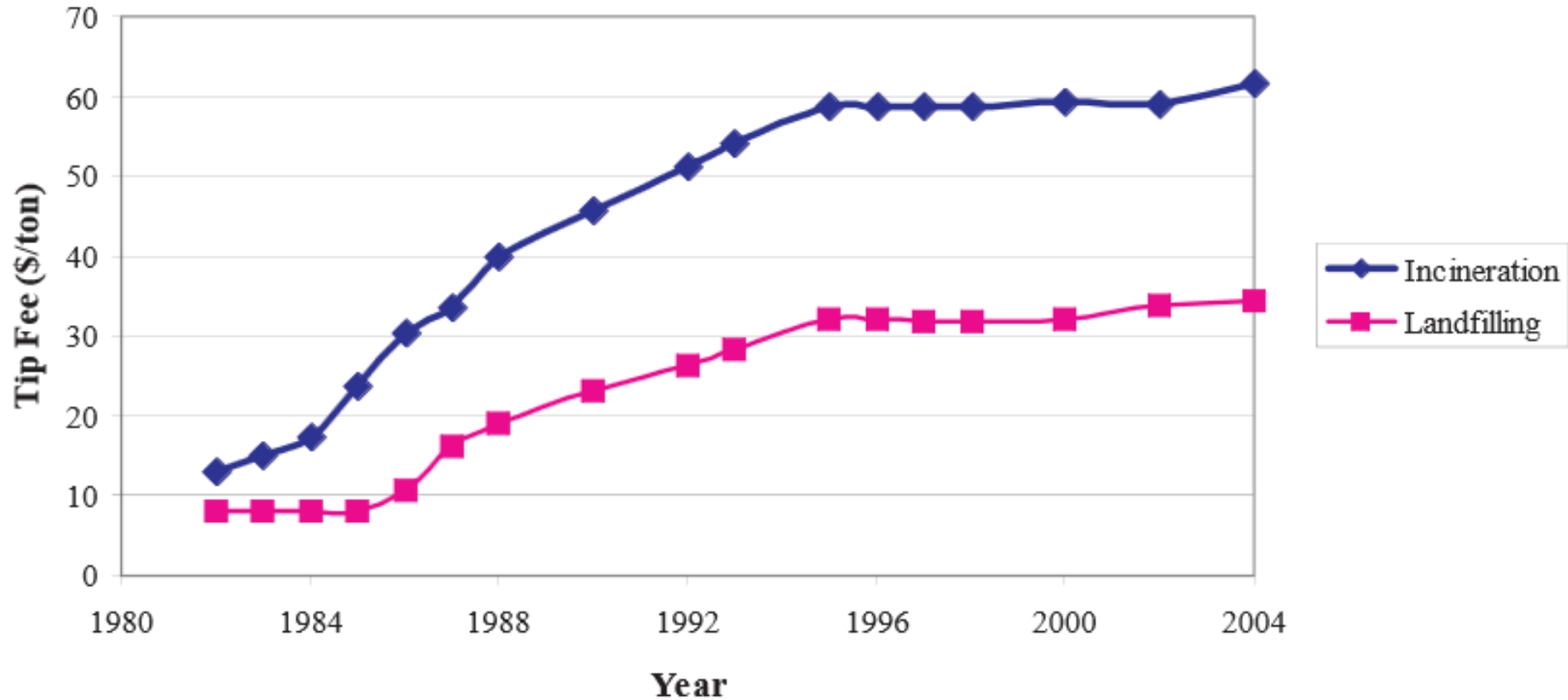
# Most Expensive Way to Manage Waste

**“Waste-to-energy is an additional capital cost. That is not in dispute, compared to a landfill... compared to a landfill, which is a less capital-intensive structure – it is more expensive. If you had a landfill next to a waste-to-energy facility, then almost in every case, you would think the landfill is going to be cheaper.”**

Ted Michaels, President, Energy Recovery Council, March 18, 2013 testimony before Washington, DC City Council

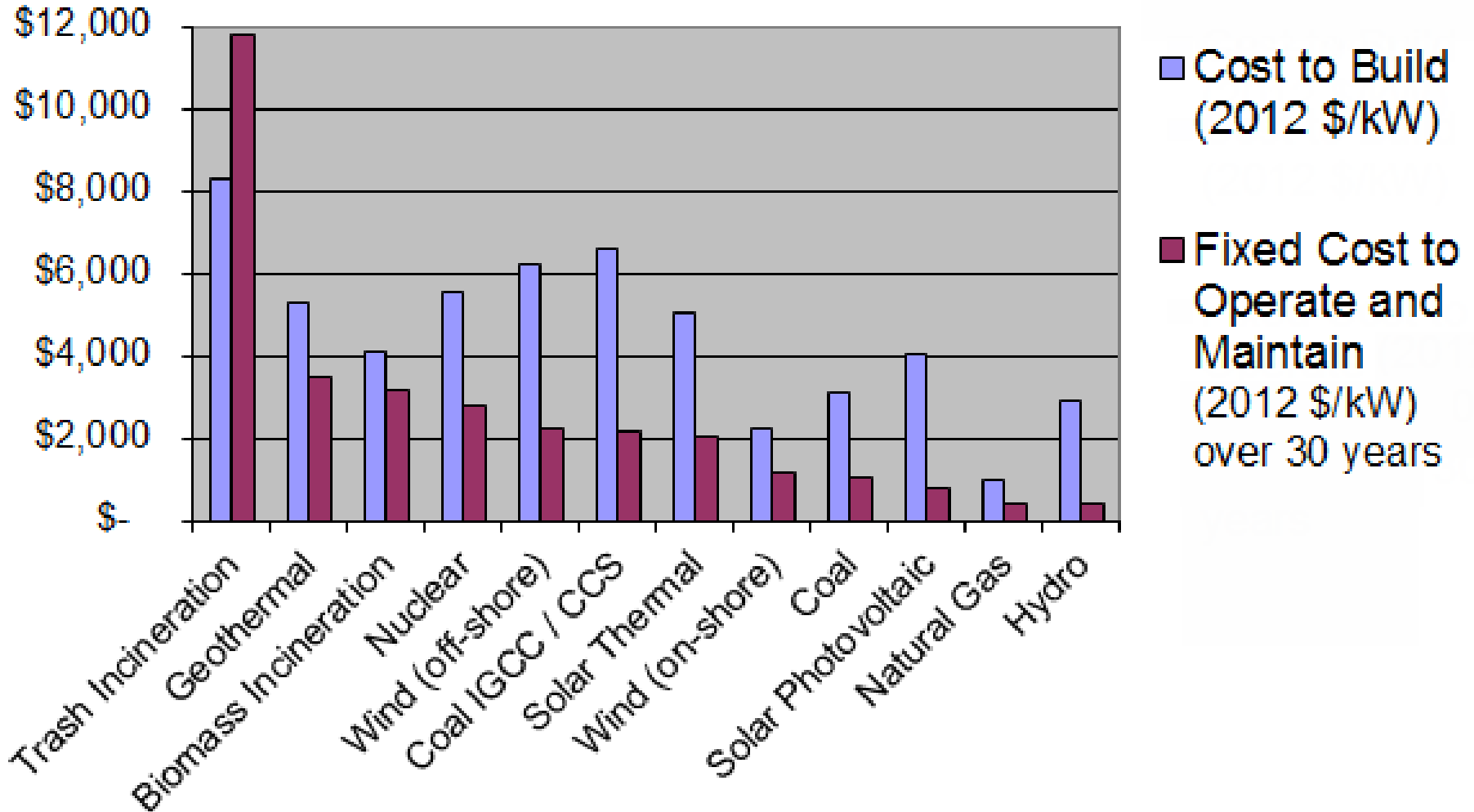
# Most Expensive Way to Manage Waste

Figure 3. Landfill and Incinerator Tip Fees



Source: National Solid Waste Management Association 2005 Tip Fee Survey, p4.  
[www.environmentalistseveryday.org/docs/Tipping-Fee-Bulletin-2005.pdf](http://www.environmentalistseveryday.org/docs/Tipping-Fee-Bulletin-2005.pdf)

# Most Expensive Way to Make Energy



Source: "Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants," Energy Information Administration, April 2013, p.6, Table 1. Full report here: [www.eia.gov/forecasts/capitalcost/pdf/updated\\_capcost.pdf](http://www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf)

# Problems with Incinerators: Economics

- Capital Intensive (Expensive)
- Requires long-term monopoly contracts including “put or pay” clauses that punish local governments if they recycle / compost
- Competes with zero waste AND energy alternatives
- Economic incentives encourage burning more dangerous wastes (getting paid to take waste vs. paying for fuels)

# A Critical Look at the Harrisburg Incinerator Project Finances

November 5<sup>th</sup>, 2003

Coalition Against the Incinerator

[www.StopTheBurn.com](http://www.StopTheBurn.com)

This and next slide excerpted from Powerpoint warning Harrisburg that it faced bankruptcy if it rebuilt its incinerator.

For full presentation, see: [www.stoptheburn.com/presentation.pdf](http://www.stoptheburn.com/presentation.pdf)

# Existing Debt vs. Incinerator Project Possibilities





# Harrisburg News Headlines

- “City of Harrisburg chapter 9 bankruptcy dismissed”
- “Harrisburg, Pennsylvania Bankruptcy Filing Rejected By Federal Judge”
- “Troubled Harrisburg now state's problem”
- “How A City Goes Broke”
- “Harrisburg Receiver Plans To Complete Transactions By June Reports”
- “Feds: Harrisburg incinerator audit ‘under review’”
- “Pa. Official: Corruption Led to Harrisburg's Money Woes”
- “Trying To Save A Broke City”
- “Harrisburg receiver says lawyers looking at incinerator audit”



# Incinerators Burn Money

- Claremont, NH: 20-year “put-or-pay” contracts caused 29 towns to file for bankruptcy in 1993, which the court denied, requiring that taxes be raised to pay back the incinerator for waste the towns did not even produce
- Hudson Falls, NY and Lake County, FL – deep incinerator debt due to long-term contracts favorable to the industry
- Poughkeepsie, NY – incinerator fails to bring in enough revenue from tipping fees and electric sales to operate without millions in annual subsidies from the county
- Detroit, MI – the nation’s largest incinerators by design capacity – has cost the ailing city \$1.2 billion in debt payments over 20 years, bringing the city close to bankruptcy on three occasions.
- All of New Jersey’s five trash incinerators had to be bailed out by the state taxpayers with over \$1.5 Billion because they could not attract enough waste to operate at capacity.

# This Week's News...

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## Ottawa severs ties with Plasco as company files for creditor protection

**JOANNE CHIANELLO**

[More from Joanne Chianello](#)

**MATTHEW PEARSON, OTTAWA CITIZEN**

[More from Matthew Pearson, Ottawa Citizen](#)

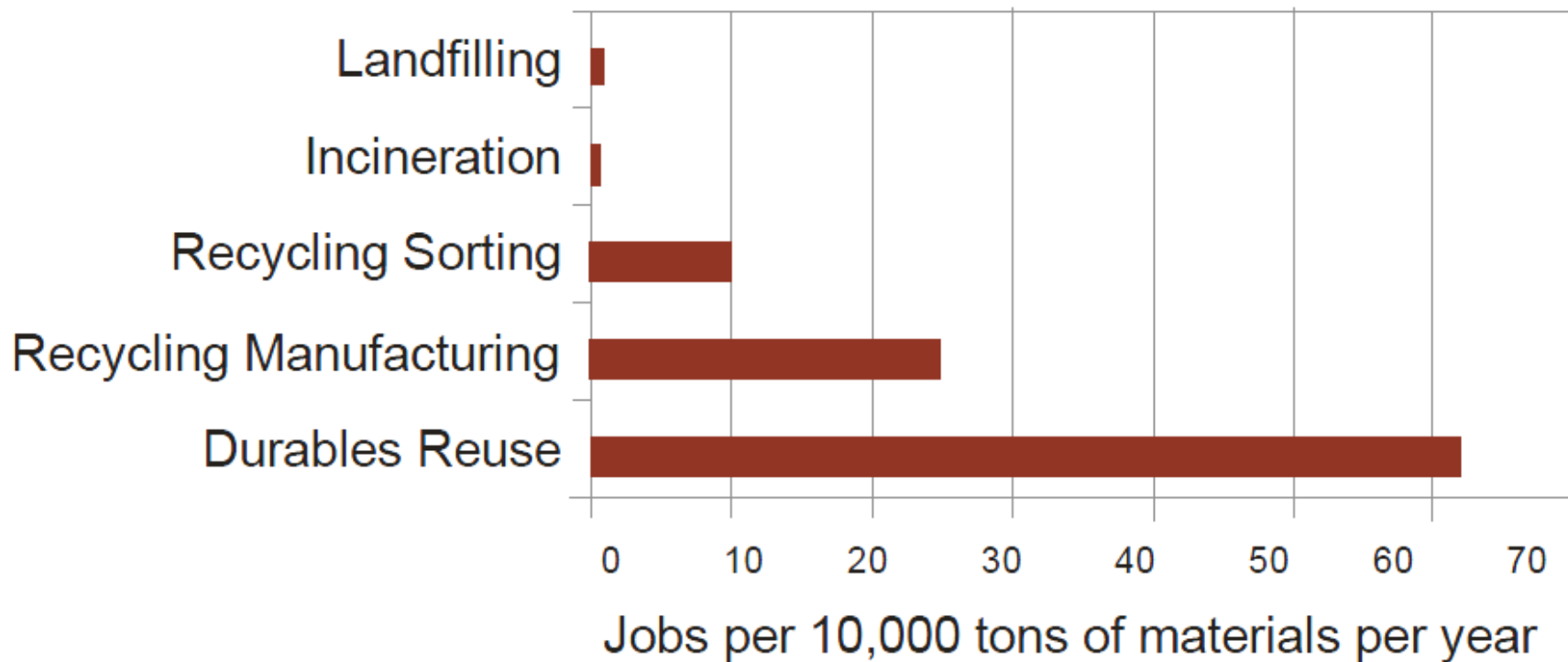
Published on: February 10, 2015 | Last Updated: February 10, 2015 9:13 PM EST



## ...is Durham Next?

# Worst Way to Create Jobs

## Job Creation: Reuse & Recycling vs Disposal



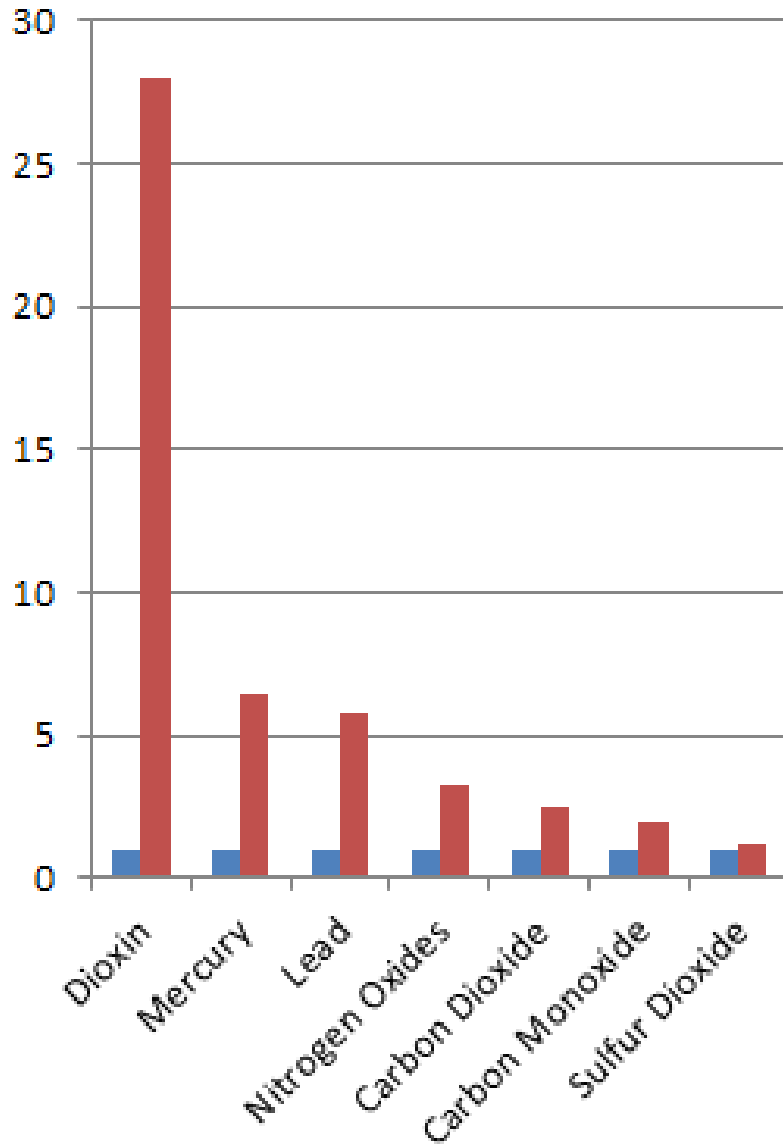
Source: Institute for Local Self Reliance

# Incineration Worse than Coal

## Toxic Air Emissions are...

- **Dioxins / furans** (28 times as much)
- **Mercury** (6-14 times as much)
- **Lead** (6 times as much)
- **Nitrogen Oxides (NO<sub>x</sub>)** (3.2 times as much)
- **Carbon Monoxide (CO)** (1.9 times as much)
- **Sulfur Dioxide (SO<sub>2</sub>)** (20% worse)
- **Carbon Dioxide (CO<sub>2</sub>)** (2.5 times as much)

# Incineration Worse than Coal



**Ratios of pollution levels emitted per unit of energy produced by U.S. coal power plants and trash incinerators**

■ Coal  
■ Trash Incineration



# Incinerator, Not a Power Plant

**“a waste-to-energy plant is designed to manage solid waste... the electricity output is a secondary function”**

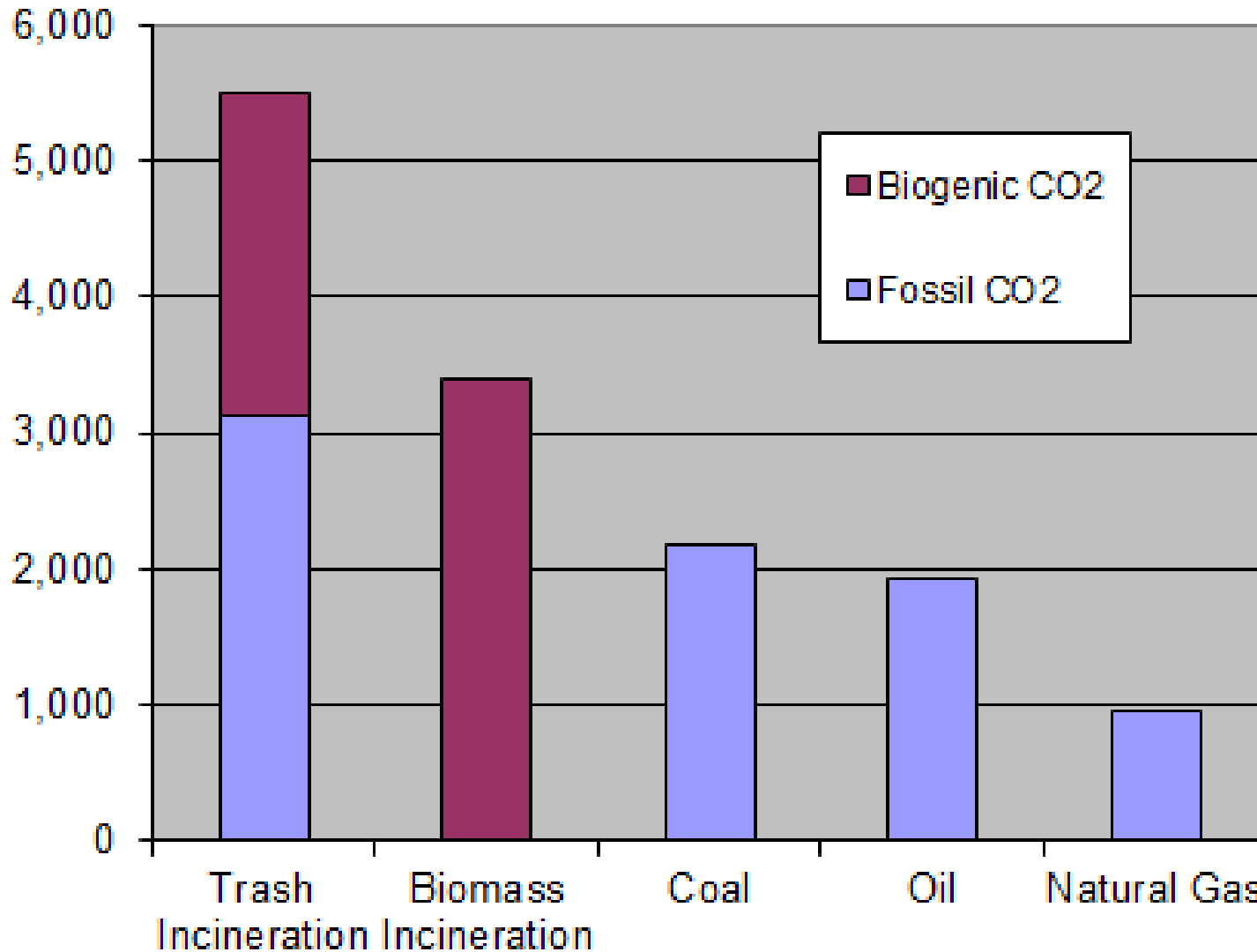
Ted Michaels, President, Energy Recovery Council, March 18, 2013 testimony before Washington, DC City Council



# Global Warming Pollution

## Smokestack CO2 Emissions from U.S. Power Plants

### CO2 (lbs/MWh)



Data is in pounds of CO2 per unit of energy produced (lbs/MWh)

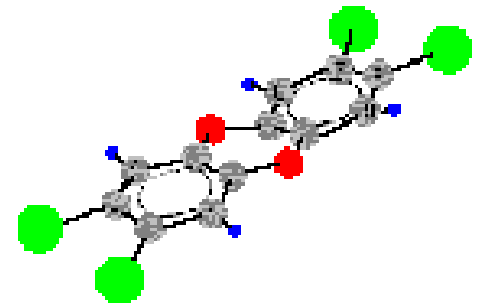
Source: U.S. EPA  
Emissions &  
Generation  
Resource Integrated  
Database (eGRID)  
v.9, released  
2/24/2014  
(2010 data)



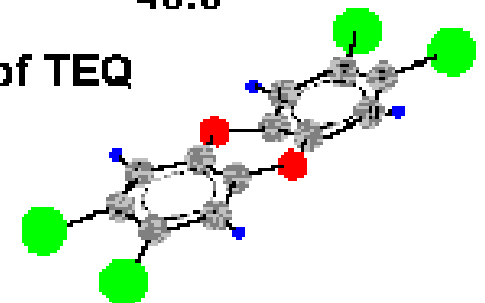
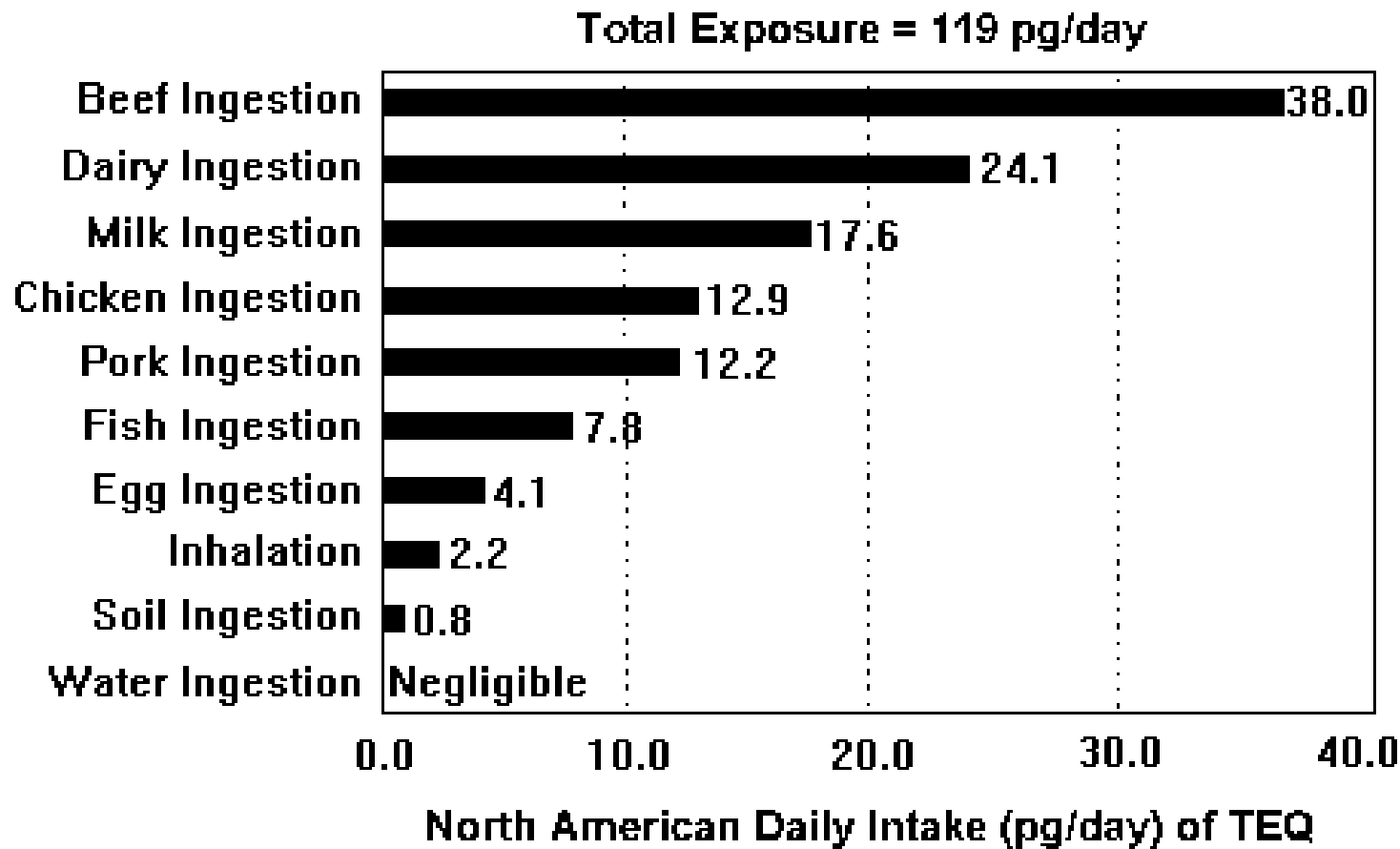
# Dioxin Facts

- Dioxins and furans are the most toxic chemicals known to science. They are highly toxic even in miniscule amounts.
- Dioxins cause infertility, learning disabilities, endometriosis, birth defects, sexual reproductive disorders, damage to the immune system, cancer and more.
- 93% of dioxin exposure is from eating meat and dairy products.

[www.ejnet.org/dioxin/](http://www.ejnet.org/dioxin/)



# Exposure to Dioxins



# Continuous Emissions Monitors

- Only generally used for 3 pollutants: sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO) plus opacity, oxygen and temperature
- Technology now exists to continuously monitor:

Ammonia (NH<sub>4</sub>)

Carbon Dioxide (CO<sub>2</sub>)

Hydrogen Sulfide (H<sub>2</sub>S)

Acid Gases:

Sulfuric Acid (H<sub>2</sub>SO<sub>4</sub>)

Hydrofluoric Acid (HF)

Hydrochloric Acid (HCl)

Products of Incomplete Combustion (PICs):

Dioxins & Furans

Polycyclic Aromatic Hydrocarbons (PAHs)

Volatile Organic Compounds (VOCs)

Particulate Matter (PM)

Metals:

Antimony (Sb)

Arsenic (As)

Barium (Ba)

Cadmium (Cd)

Chromium (Cr)

Lead (Pb)

Manganese (Mn)

Mercury (Hg)

Silver (Ag)

Nickel (Ni)

Zinc (Zn)

...and more



# Incineration Worse than Landfills

- Incinerators still require landfills for their toxic ash
- Choice is NOT landfill vs. incinerator, but:

**landfill**

vs.

**incinerator AND a smaller, more toxic landfill**

# Incineration Worse than Landfills

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vs.

**incinerator AND a smaller, more toxic landfill**

**OR...**

**Zero Waste and minimal landfilling**

# Incineration Worse than Landfills

- Incinerators still require landfills for their toxic ash
- 30 tons of ash produced for every 100 tons burned





# Incinerator Ash = Hazardous Waste

Incinerator ash is toxic, but the U.S. EPA allows a special test that enables it to test as non-hazardous, saving the industry a lot of money

Despite Canada relying on the same test, Vancouver's incinerator ash is leaching toxic cadmium at levels about twice the province's acceptable limits. They've had to ship the hazardous ash to a hazardous waste landfill in Alberta.



# Trash Incinerator Health Impacts





# Trash Incinerator Health Impacts

- Increased dioxins in blood of incinerator workers
- Increased cancers, especially:
  - laryngeal and lung cancers
  - childhood cancers
  - colorectal
  - liver
  - stomach
  - leukemia
  - soft-tissue sarcoma
  - non-Hodgkin's lymphoma
- Increases in babies born with spina bifida or heart defects
- Increases in pre-term births

# Over 99% of Trash Incinerator Siting Attempts Fail... most due to public opposition

**May 2014:  
Elected officials join incinerator protest**

**A dozen anti-incinerator protesters called on the provincial government Wednesday to immediately stop Metro Vancouver's plans for a waste-to-energy facility, saying opposition is growing across B. C.**



# Over 99% of Trash Incinerator Siting Attempts Fail... most due to public opposition

**Aug 2011:**

**Angry protesters disrupt Durham incinerator groundbreaking ceremony**



# Over 99% of Trash Incinerator Siting Attempts Fail... most due to public opposition

**June 2014:  
Ohsweken, ON:**

**Protest halts Six Nations incinerator trial as waste crisis continues**

**Residents skeptical of Nova Scotian inventor's 30-year-old machine**



# Zero Waste Jobs



Deconstruction Crew, Second Chance, Baltimore, MD. Photo Credit: C. Seldman

# What is Zero Waste?

**“Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use.**

**Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.**

**Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.”**

# **If you're not for Zero Waste, how much waste are you for?**

Zero waste is recognized as achieving 90% or greater diversion from landfills and incinerators.

The goal is to get as close to zero as possible, without getting caught up on the impossibility of actually hitting zero.

“Zero waste” is like “zero drug tolerance” or “zero accidents in the workplace” standards. Zero is the goal, and the right policies will get you as close as you can get.



# Zero Waste Never Includes Incineration

**“Zero waste to landfill” is not zero waste**

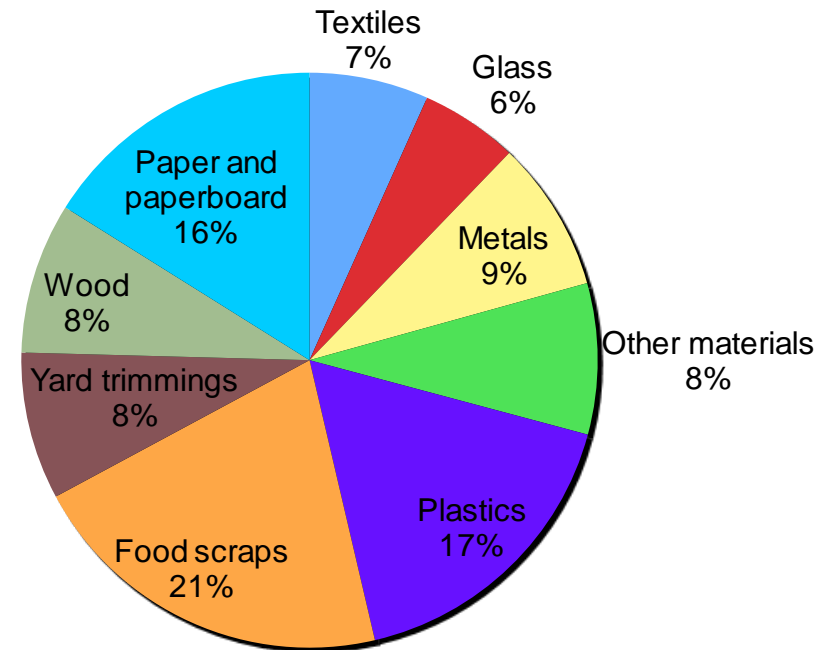
Fake “Zero Waste” promoters in Canada:

- National Zero Waste Council
- Metro Vancouver / Zero Waste Committee



# Money Thrown Away

**\$11.4 billion worth of recyclable packaging wasted (sent to landfills and incinerators) in 2010**



Source: "Unfinished Business: The Case for Extended Producer Responsibility," 2012 Report, [www.asyouow.org/sustainability/eprreport.shtml](http://www.asyouow.org/sustainability/eprreport.shtml)

# Zero Waste Hierarchy

- Rethink / Redesign
- Reduce
- Reuse
- Source Separate:
  - Recycle
  - Compost
  - Waste
    - Research
    - Mechanically remove additional recyclables
    - Anaerobically digest residuals
- Stabilized (digested) residuals to landfill

[www.energyjustice.net/zerowaste](http://www.energyjustice.net/zerowaste)

# For more Info...

- Incineration:
  - [www.EnergyJustice.net/incineration](http://www.EnergyJustice.net/incineration)
  - [www.EnergyJustice.net/biomass](http://www.EnergyJustice.net/biomass)
  - [www.EnergyJustice.net/tires](http://www.EnergyJustice.net/tires)
  - [www.no-burn.org](http://www.no-burn.org)
  - [www.GreenAction.org](http://www.GreenAction.org)
- Landfills and Landfill Gas Burning:
  - [www.EnergyJustice.net/lfg](http://www.EnergyJustice.net/lfg)
  - [www.ejnet.org/landfills](http://www.ejnet.org/landfills)
  - [www.beyondlandfilling.org](http://www.beyondlandfilling.org)
- Zero Waste:
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  - [www.ilsr.org/initiatives/waste-to-wealth](http://www.ilsr.org/initiatives/waste-to-wealth)
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